Exelon Generation Company, LLC
Dresden Nuclear Power Station
6500 North Dresden Road
Morris, IL 60450-9765

www.exeloncorp.com

Exelon Nuclear

10 CFR 50.73

SVPLTR # 10-0050

December 10, 2010

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Dresden Nuclear Power Station, Unit 3
Renewed Facility Operating License No. DPR-25
NRC Docket No. 50-249

Subject: Licensee Event Report 249/2010-001-00, "OPRM Power Supply Failure during Maintenance Results in Unit 3 Automatic Reactor Scram"

Enclosed is Licensee Event Report 249/2010-001-00, "OPRM Power Supply Failure during Maintenance Results in Unit 3 Automatic Reactor Scram" for Dresden Nuclear Power Station, Unit 3. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B).

There are no regulatory commitments contained in this submittal.

Should you have any questions concerning this letter, please contact Mr. Dennis Leggett at (815) 416-2800.

Respectfully,

Tim Hanley
Site Vice President
Dresden Nuclear Power Station

Enclosure

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station

IE22
NRR

NRC FORM 366 (10-2010) | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED BY OMB: NO. 3150-0104 | EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Dresden Nuclear Power Station, Unit 3	05000249	1 OF 4

4. TITLE

OPRM Power Supply Failure during Maintenance Results in Unit 3 Automatic Reactor Scram

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	05000
10	11	2010	2010	001	00	12	10	2010	N/A	05000

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER *(Include Area Code)*
Riley Ruffin	815-416-2815

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	JC	RJX	A252	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

During preparation for planned maintenance to perform testing of the Electrical Protection Assembly breakers, plant personnel transferred the Reactor Protection System from its normal power supply to its reserve power supply in accordance with approved plant procedures. While transferring from the normal to reserve power supply, the main control room received an expected half-scram signal due to the 3A RPS bus undergoing a dead-bus transfer. The breaker for the reserve power supply was closed which provided power to the 3A RPS bus. However, prior to the half-scram being reset, a power supply failure occurred in the Oscillation Power Range Monitoring System on the opposite RPS division. The concurrent half-scram signals resulted in a full RPS actuation. All control rods fully inserted. Reactor water level was maintained using the Condensate and Feedwater Systems. Reactor pressure was controlled using the Main Turbine Bypass Valves to the Main Condenser.

Following the scram, the Auxiliary Power System transferred from its main power source to the reserve power source, as designed. During this transfer, the Unit 2/3 Emergency Diesel Generator automatically started. This automatic start occurred as the result of the EDG start logic momentarily sensing both the main power source breaker and the reserve power source breaker contacts being open concurrently. Since there was no undervoltage signal received, the automatic start of the EDG is considered invalid.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B).

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Dresden Nuclear Power Station, Unit 3	05000249	2010	- 001 -	00	2 OF 4

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

Dresden Nuclear Power Station (DNPS) Unit 3 is a General Electric Company Boiling Water Reactor with a licensed maximum power level of 2957 megawatts thermal. The Energy Industry Identification System codes used in the text are identified as [XX].

A. Plant Conditions Prior to Event:

Unit: 03 | Event Date: 10-11-2010 | Event Time: 1004 hours
Reactor Mode: 1 | Mode Name: Power Operation | Power Level: 100 percent

B. Description of Event:

On October 11, 2010 at approximately 1004 hours CDT, personnel on Dresden Unit 3 were preparing to perform a test of the Electrical Protection Assembly (EPA) breakers. The EPA breakers are a part of the Reactor Protection System (RPS) [JC]. In order to perform this test, the 3A RPS bus was transferred from its normal power supply to the reserve power supply. This transfer evolution requires a dead-bus transfer. When the RPS bus is de-energized, a half-scram is generated, per design.

Using approved plant procedures, personnel de-energized the 3A RPS bus. The Main Control Room received the expected half-scram on the 'A' RPS. The 3A bus was re-energized from the reserve power supply. Prior to the half-scram being reset, a half-scram signal was generated from the 'B' RPS. The unexpected half-scram signal concurrently with a half-scram signal that was planned during maintenance preparations resulted in a full RPS actuation.

All control rods inserted to their full-in positions. Vessel level was controlled using the condensate [SD] and feedwater [SJ] systems. Vessel pressure control was maintained using the main turbine bypass valves to the main condenser.

Following the reactor scram, the Auxiliary Power System [EB] transferred from it main power source to the reserve power source. During the transfer the Unit 2/3 Emergency Diesel Generator (EDG) [EK] automatically started. The start signal was due to the EDG start logic sensing the contact for the main feed breaker and the contacts for the reserve feed breaker to Bus 33 being open concurrently. Based on historical events, this condition typically exists for approximately 74 milliseconds. The bus never experienced an under-voltage condition during the transfer. Therefore, the automatic start is an invalid actuation of the EDG start logic.

The plant was stabilized and troubleshooting commenced.

C. Cause of Event:

The half-scram signal that occurred on 'B' RPS was generated from the when the 3-0590-107F relay de-energized. This relay is associated with the Nuclear Instrumentation portion of the RPS system. This relay is associated with Intermediate Range Monitor (IRM) 16, Average Power Range Monitor (APRM) 6 and Oscillation Power Range Monitor (OPRM) 6. With the Mode switch in RUN, the IRM was bypassed and could not generate a trip signal.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Dresden Nuclear Power Station, Unit 3	05000249	2010	- 001 -	00	3 OF 4

NARRATIVE

The operating procedure that was being used to transfer the RPS bus, DOP 0500-03 Reactor Protection System Power Supply Operation, contained a prerequisite to place APRM 6 in bypass prior to commencing the bus transfer. The OPRM was the only active component in the 107F relay string.

Troubleshooting indicated that OPRM 6 had no power. Further investigation revealed that the input fuse had blown on the OPRM power supply causing it to lose output power.

Initial examination of the circuit board, did not reveal any failures of board components other than the blown input fuse. The board was sent out for additional testing. No defects were identified besides the blown input fuse. The fuse was replaced and the power supply was successfully turned on. All indications were within expected ranges. Following seventy-two hours of operation, no defects were identified. The power supply was sent for a detailed failure analysis.

A failure analysis of the power supply indicates that the OPRM 5 Vdc power supply is susceptible to electrical noise.

The power supply is designed with a circuit (Crowbar Circuit) which senses voltage transients and prevents the voltage excursion from damaging voltage sensitive components downstream of the power supply output. When a voltage spike occurs, the crowbar circuit is activated, which essentially shorts the circuit to ground and blows the input fuse. This results in the power supply being turned off thus terminating the voltage transient on the down stream components.

Efforts have been made to identify the source of the electromagnetic interference. However, the source has not been identified at this time. Investigations and failure analyses are continuing in order to mitigate the affects of electromagnetic interferences on the OPRM power supplies.

D. Safety Analysis:

Following the scram, the plant response and appropriate Operator actions taken, indicates that the event is of low risk significance. The safety significance of this event is minimal due to minimal consequential impact on the health and safety of the public and reactor safety.

E. Corrective Actions:

The failed 5 Vdc power supply for OPRM 6 was replaced.

Planned work activities which require transfer of the RPS buses to their reserve power supplies are being moved to times that the OPRM system is not required to be operable. This practice will continue until a more viable resolution can be implemented.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Dresden Nuclear Power Station, Unit 3	05000249	2010	- 001 -	00	4 OF 4

NARRATIVE

F. Previous Occurrences:

A review of DNPS Licensee Event Reports (LERs) for the last three years did not identify any LERs associated with a failure of Nuclear Instrumentation power supplies.

G. Component Failure Data:

Manufacture	Model	Component
ABB Combustion Engineering	2001731-017	Power Supply